SEWAGE AND THE DISPOSAL PLANT

By W. D. SHEETS, Ch.E. 4

Perhaps the title will bring to mind the recent controversy among the city fathers and engineers over the present sewage disposal plant of Columbus. Without a doubt there is room for improvement in the present system.

Few people care to visit the sewage disposal plant in South Columbus and so the important points are not well known. Even the people who live in that vicinity are rather particular about keeping their distance with such a neighbor.

The purpose of sewage disposal is to minimize the pollution of creeks and rivers and thus prevent the spreading of disease. However, you may inquire, why do not all towns and cities have a disposal plant?

It is a known fact that practically all river water contains a certain amount of dissolved air. Since a large number of towns and cities are located near large waterways the sewage is run directly into the stream and the dissolved air causes fermentation of all the solid matter which settles to the bottom. In this case Nature provides the disposal plant and a man-made plant is not required.

In Columbus, and similarly located communities, there is not enough water to carry away the sewage by this method and hence a disposal plant is necessary. At certain seasons of the year the flow of sewage exceeds the flow of water in the Scioto River and this last summer was not an exception. Approximately 30,000,000 gallons of sewage are treated per day.

The sewage is gathered from all over the city by the system of sewer mains that are installed in the various sections as fast as they become a portion of the city. These mains are so constructed that gravity flow is used as much as possible. To aid the gravity flow there are four pumping stations, the Industrial Avenue Pumping Station, the Nelson Road Pumping Station, the East Side Pumping Station and the Main Pumping Station.

The first three stations are substations and pump to the Main Pumping Station which is located a little over a mile above the Sewage Disposal Plant and west of the Scioto River.

In the last year an engineering feat of interest was accomplished in the construction of a cross-town sewer main running east to west by means of a tunnel driven under the city, work being done at several points simultaneously. This tunnel is 70 feet under ground at the deepest point and is over 7 miles long. The object of its construction was to eliminate the East Side Pumping Station which was previously necessary to remove all sewage from that section due to the fact that there is a natural watershed between Alum Creek and the Scioto River, causing the sewage and storm waters to flow in that direction. The main is low enough to overcome this flow and having a slight fall in the opposite direction causes the sewage to flow back to the Main Pumping Station.

All the sewage eventually arrives at the Main Pumping Station and is run into two sand catchers consisting of two concrete pits much larger than the mains, thereby decreasing the flow sufficiently to allow the sand and gravel from the streets to settle to the bottom of the pit. The pits are cleaned by means of a crane and clam shell bucket as the occasion demands.

The sewage next passes through two vertical bar cage screens which remove floating twigs, leaves, and other material that might clog the pumps. These screens are cleaned once every eight hours by manual labor.

The sewage is then picked up by the centrifugal pumps and is pumped, via a 40-inch main, 6,336 feet long equipped with a Venturi meter with oil seals to measure the flow, to the Sewage Disposal Plant.

Here the sewage is fed into the Imhoff tanks. These tanks are of concrete construction. It takes approximately four hours for the liquid under treatment to pass from one end to the other of the tanks. Fermentation takes place with the sludge settling to the bottom chamber from where it is washed on to the drying flats where it is allowed to stay until dry enough to move. It is then shoveled into cars and hauled to the dump.

The sludge may be used for fertilizer but is of low nitrogen and phosphate content and is not in great demand for this purpose.

The liquid coming from the tanks runs into a large concrete basin high enough to supply a head of approximately 19 feet which is used in forcing the liquid through the rest of the system. From this basin the liquid is piped to the sprinkling beds, consisting of 10 acres of crushed limestone five and one-half feet deep, and is distributed over the beds by means of 2,100 nozzles. After passing through the sprinklers the liquid is drained from the beds and is piped through mains to the river.

About 60 per cent of the solid matter is removed from the water in the Imhoff tanks and the sprinklers remove 10 to 20 per cent more by introducing more air, resulting in further fermentation, and precipitation of part of the soluble material which settles out after the water has reached the river.

The sprinkling beds are controlled by valves located in the gate house, a round brick building situated in the middle of the sprinkling beds, and which reminds one of a guard house on a penitentiary wall.

The plant is to be improved by some means, possibly a change in method of treating the sludge.

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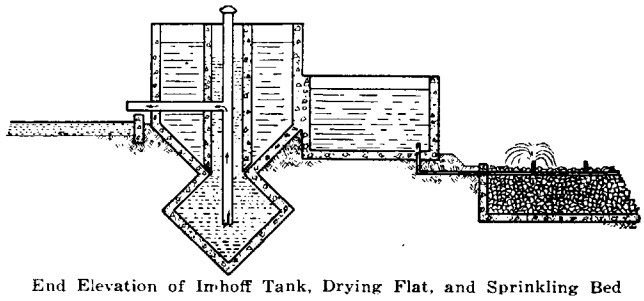

End Elevation of Imhoff Tank, Drying Flat, and Sprinkling Bed

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There seems to be a difference in viewpoints as to the location of the plant when the change takes place as the South Columbus residents are not so sure of the engineers' ability to build a plant which will reduce the odors sufficiently.

There are a number of methods available and two were proposed for installation, but failed to meet with approval. They were, a chemical treatment, and one for aeration of the sludge. Now various methods are under consideration without active measures being taken to begin installation before knowing what the methods will do.

One of the most important considerations is that of cost. If the results obtained justify a high original cost, they must be somewhat productive and permit the plant to bring in sufficient returns on the investment. And again Columbus is growing and the allowance for future needs will mean a larger installation than is necessary at the present time.